

Appl. No. 10/827,232
Amendment dated: April 18, 2005
Reply to OA of: November 16, 2004

Amendments to the Specification:

Please replace the original Abstract with the new Abstract found at the end of this paper on a separate sheet as required.

On page 1, please replace the first full paragraph with the following amended paragraph.

The present invention relates generally to a radiator module and, more specifically, a water-cool radiator module that is separated from a heavy water tank, a cold water pipe and a hot water pipe that are independently fixed in a slot for the purpose ~~to reduce~~ of reducing the load on the heat-generating electronic components and not ~~occupy the~~ occupying too much of the space of the electronic components.

Please replace the paragraphs after the Description of the Prior Art which include the listing with the following amended paragraphs.

Heretofore, it is known that a conventional radiator, ~~[[As]]~~ as shown in Fig.1, generally comprises a flat pedestal 10 that comprises a plurality of radiating fins 11 and a water conduit (not shown in Fig. 1) on the other side; the water conduit comprises a water inlet 12 and a water outlet 13; the pedestal 10 further comprises a fan 30. In practical use, this configuration has the following disadvantages:

1. In addition to radiating fins 11, some water conduit accessories are also located under the radiating fins 11. Such mechanism not only increases the height of the radiator structure, but also increases the load of heat-generating electronic components due to the increased weight of water in the water conduit. As a result, this may cause damage to such electronic component components and ~~occupies larger~~ occupy more space.

2. Water in the water conduit stays and exchanges heat between the radiating fins 11. Therefore, heat stays on the radiating fins 11 resulting in a very slow radiating speed.

3. Fan 30 is located on the radiating fins 11. When fan 30 is turned on, heat current will flow slowly through a computer and then flow outward through the radiating holes ~~outside~~ on the computer. As a result, the heat may ~~stay~~ remain in the computer.

On page 2, please replace the first full paragraph with the following amended paragraph.

It is therefore a primary object of the present invention to provide a water-cool radiator module that comprises a supporting part ~~that further comprises~~ having a shell body; the shell body comprises a fan and a water tank; the water tank is connected to a cold water pipe and a hot water pipe; ~~[[the]]~~ an extended section of the cold water pipe and hot water pipe ~~connects~~ is connected to a cold waterhead; the shell body further comprises several radiating holes at one end; in practical application, the supporting part is fixed into a slot on the computer case and the shell body is ~~firmly fixed on~~ mounted onto the slot; cold water on a heat-generating electronic component is ~~[[sent]]~~ circulated to the shell body via the hot ~~[[the]]~~ water pipe; ~~blown by the fan[[,]]~~ heat is radiated outward blows air to radiate the heat to the outside via the radiating holes; and the ~~cool~~ cooled fluid flows from the water tank to the cold waterhead via the cold water pipe. With repeated circulation, the heat produced by the electronic component is taken away quickly. On the other hand, since the water tank, the radiating fins and the fan are all fixed ~~[[on]]~~ into the slot, the heat-generating electronic component does not bear the weight of the water tank, the radiating fins and the fan. As a result, this reduces the possibility of any damage to the heat-generating electronic component and saves space above the heat-generating electronic component.

Please replace the third full paragraph with the following amended paragraph on page 2.

It is still another object for the invention to provide a water-cool radiator module in which a fixing part is installed near the radiating holes of the supporting part, several holes are on the fixing part; in practical application, the supporting part is inserted into the slot, the fixing part is fixed firmly on the computer case to secure the shell body ~~install more stable onto~~ to the slot without swaying.

On page 3, please replace the first, second and third full paragraphs after the heading Description of the Preferred Embodiment which bridges page 4 with the following amended paragraphs.

Fig.2 shows a water-cool radiator module in accordance with a preferred embodiment of the ~~water-cool radiator module in present invention,~~ wherein the module comprises a supporting part 10, ~~[[a]] the supporting part 10 can couple~~ may be coupled with the interfaces of various types of ~~extended expansion~~ slots such as AGP, PCI and ISA on one side~~[[,]] and the supporting part 10 comprises a fixing part 20 on the other side;~~ is inserted into the expansion slot, the supporting part 10 ~~comprising~~ having a fixing part 20 on the other side; the fixing part 20 is perpendicular to supporting part 10 and comprises holes 21.

As shown in Fig.3, the supporting part 10 comprises a shell body 30; the shell body 30 comprises a water tank 310 ~~connects~~ connected to a cold water pipe 32 and ~~a hot water pipe 33 on the other side;~~ the other side of the water tank 310 is connected to a first hot water pipe 33a, and an extended part of the first hot water pipe 33a is in a continuous bending shape; several radiating fins 34 are aligned orderly on the bending section of the first hot water pipe ~~[[33]] 33a;~~ a fan 35 is located adjacent to the radiating fins 34; an opening 37 is located at a region where the shell body 30 is not braced against the supporting part 10; the opening 37 faces ~~[[the]]~~ a blowing opening of the fan

35; a pump 31 is located beside the fan 35 and connected to the first hot water pipe ~~[[33]] 33a and a second hot water pipe 33b~~; the first hot water pipe ~~[[33]] 33a~~ extends outward from the pump 31 and connects to a cold waterhead 40; the cold waterhead 40 is also connected ~~[[with]] to the~~ cold water pipe 32; several radiating holes 36 are located on the side where the shell body 30 faces the holes 21.

In practical use, as shown in ~~Fig.2, Fig.3 and Fig.5~~ Figs.2, 3 and 5, users install the cold waterhead 40 on the heat-generating electronic components (a processor in this application), and insert the cold waterhead 40 into the slot on the computer case via the supporting part 10; the supporting part 10 is fixed in a slot on the computer case by the fixing of the fixing part 20 on the back of computer case, the shell body 30 is firmly fixed ~~[[on]] into~~ the slot; such that the heat conducted from an electronic ~~components~~ component to the cold waterhead 40 will raise the temperature of the fluid in the cold waterhead 40. By the driving of the pump 31, hot water flows back to the pump 31 via the second hot water pipe ~~[[33]] 33b~~ and out of the pump 31 via the first hot water pipe 33a and then flows through the radiating fins 34; the fan 35 draws cold air into the shell body 30 to cool the water flowing through the radiating fins 34; after the heat in the water is quickly radiated through the radiating holes 36 and the holes 21, cool water flows from water tank 310 to the cold waterhead 40 via the cold water pipe 32. With repeated circulation, the heat produced by the electronic component is taken away quickly. On the other hand, since the cold waterhead 40 is separated from the water tank 310, the radiating fins 34 and the fan 35, and the water tank 310, the radiating fins 34 and the fan 35 are all fixed ~~[[on]] into the~~ slot, the heat-generating electronic component does not bear the weight of the water tank 310, the radiating fins 34 and the fan 35. As a result, such ~~scheme~~ arrangement reduces the possibility of any damage to the heat-generating electronic component and saves space above the heat-generating electronic component.

Please replace the last full paragraph on page 4 which bridges page 5 with the following amended paragraph.

Fig.4 shows another application of the present invention wherein the radiator module comprises a shell body 30; a supporting part 10 ~~[[is]]~~ attached on both sides of the shell body 30; and the supporting part 10 ~~can be~~ inserted into two slots; one side of the supporting part 10 comprises a fixing part 20 that is connected to the supporting part 10; the fixing part 20 is perpendicular to the supporting part 10 and comprises holes 21; the supporting part 10 further comprises a shell body 30; the shell body 30 comprises a water tank 310 ~~which connects~~ connected to a cold water pipe 32 and a first hot water pipe ~~[[33]]~~ 33a; the first hot water pipe ~~[[33]]~~ 33a is in a continuous bending shape and extends outward via water tank 310, several radiating fins 34 are aligned orderly on the bending section of the hot water pipe 33; a fan 35 is located beside the radiating fins 34; an opening 37 is located at a region where the shell body 30 is not braced against the supporting part 10; the opening 37 faces the fan 35; a pump 31 is located beside the fan 35 and connected to the first hot water pipe 33; ~~the 33a and a second~~ hot water pipe ~~[[33]]~~; the second hot water pipe 33a extends outward via pump 31 and connects to a cold waterhead 40; the cold waterhead 40 is also connected to the cold water pipe 32; several radiating holes 36 are located on the side where the shell body 30 faces the holes 21.

On page 5, please replace the first full paragraph with the following amended paragraph.

In practical use, as shown in ~~Fig.3, Fig.4 and Fig.5~~ Figs.3, 4 and 5, users install the cold waterhead 40 on the heat-generating electronic component (a processor in this application), and insert the cold waterhead 40 into the slot on the computer case via the supporting part 10, the supporting part 10 is fixed in a slot on the computer case by the fixing of the fixing part 20 on the back of computer case, the shell body 30 is firmly fixed on the slot; such that the heat conducted from electronic component to cold waterhead 40 will raise the temperature of the water in the cold waterhead 40. By the driving of the pump 31, hot water flows back to the pump 31 via the second hot water pipe ~~33 and 33b~~

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and out of the pump 31 via the first hot water pipe 33a and then flows through the radiating fins 34; the fan 35 draws cold air into the shell body 30 to cool water flowing through the radiating fins 34; after the heat in the water is quickly radiated through the radiating holes 36 and the holes 21, cool water flows from the water tank 310 to the cold waterhead 40 via the cold water pipe 32. With repeated ~~circulation~~ circulations, the heat produced by the electronic component is taken away quickly. On the other hand, since the cold waterhead 40 is separated from the water tank 310, the radiating fins 34 and the fan 35, and the water tank 310, the radiating fins 34 and the fan 35 are all fixed on slot, the heat-generating electronic component does not bear the weight of the water tank 310, the radiating fins 34 and the fan 35. As a result, this reduces the possibility of any damage to the heat-generating electronic component and saves space above the heat-generating electronic component.